

BREATHE BETTER PROGRAM ANNUAL REPORT 2012-2013

Breathe Better is an anti-idling/clean air campaign. The goal of this program is to protect the health of children by reducing harmful vehicle emissions around school campuses. This program is ideal for any private or public school and can be implemented at all levels: elementary, middle and high.

Breathe Better is an environmental sustainability project that can be easily developed, implemented and maintained. It is a voluntary initiative, so there is no cost to participate in the program.

During the 2012-2013 school year, the Breathe Better project had a total of **61** school committed. However, only **39** of those of schools were considered active and submitted usable data. **Usable data** is defined as submission of at least two data sets. This requires a baseline data set starting the Breathe Better campaign near the beginning of the school year and at least one additional data set before the end of the school year. Only schools that submitted two data sets are included in the calculations.

Data is summarized below:

CARS	BASELINE			FINAL			
	Total # of schools reporting	Total # cars	# Idling	% Idling	Total # cars	# Idling	% Idling
39	2,223	535	24.1	2,440	476	19.5	434

FINAL CAR RESULTS	
# Ceased Idling	% Idling Reduction
101	18.9

BUSES	BASELINE			FINAL			
	Total # of schools reporting	Total # Buses	# Idling	% Idling	Total # Buses	# Idling	% Idling
39	217	59	27.2	220	37	16.8	36

FINAL BUS RESULTS	
# Ceased Idling	% Idling Reduction
23	38

*"Adjusted # idling" for cars and buses take into account the difference in baseline and final total numbers for each.

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Outcome #1: Audience Reached

The Breathe Better program impacted approximately **41,673 students, parents, and bus drivers** and **61 schools** in our state.

Table 1: Schools with a Baseline and Final Count

- 24,125 students (this number represents the total number of students enrolled)
- 2,440 parents/guardian (this number represents 1(one) parent/guardian per vehicle in line)
- 220 bus drivers (this number represents the number of buses in line)

Schools with a Baseline and Final Count

Regions	Participating School by Counties	Students Enrolled	Total # of Students
Pee Dee	Horry Burgess Elem Ocean Bay Middle	631 1066	1,697
Lowcountry	Charleston Daniel Island Academy	280	280
Upstate	Anderson Hunts Meadow Elementary Wren Elementary Greenville A.J. Whittenberg Elementary Christ Church Episcopal School Fountain Inn Elementary Oakview Elementary Sevier Middle Sterling School Stone Academy Summit Drive Elementary Taylors Elem Pickens Pickens Middle Spartanburg Pine Street Elementary Spartanburg Charter School	426 567 390 960 791 1,241 614 746 583 420 739 834 679 313	9,303

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Regions	Participating School by Counties	Students Enrolled	Total # of Students	
Midlands	Lancaster Indian Land Middle	571		
	Lexington Pleasant Hill Elementary White Knoll High	872 1,905		
	Newberry Newberry Elementary Newberry High Prosperity-Rikard	412 752 332		
	Richland A.C. Moore Elementary Bridge Creek Elementary Columbia Jewish Day Covenant Christian School H.E. Corley Elementary Langford Elementary Leaphart Elementary Longleaf Middle Nursery Road Elementary Round Top Elementary W.J. Keenan High	423 591 48 180 556 496 449 646 542 620 740		
	York Bellevue Elementary Ebinport Elementary Finley Road Elementary Springfield Elementary Springfield Middle	454 538 435 563 720	12,845	
	Total of Students Impacted			24,125

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Table 2: Schools with a Baseline Count Only

- 3,585 students (this number represents the total number of students enrolled)
- 371 parents/guardian (this number represents 1(one) parent/guardian per vehicle in line)
- 37 bus drivers (this number represents the number of buses in line)

Schools with a Baseline Count Only

Regions	Participating School by Counties	Students Enrolled	Total # of Students
Upstate	Greenville Augusta Circle Elementary	509	509
Midlands	Kershaw Doby's Mill Elementary	560	3,076
	Lancaster Indian Land Elementary	1,312	
	Lexington Meadow Glen Elementary	561	
	Richland River Springs Elementary	643	
Total of Students Impacted			3,585

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Table 3: School that did not submit data (Anti-Idling Signage Only)

- 10,895 students (this number represents the total number of students enrolled)
- Anti-idling signs on posted on school campuses
- Data for parents/guardians and buses not reported

School that did not submit data (Anti-Idling Signage Only)

Regions	Participating School by Counties	Students Enrolled	Total # of Students	
Pee Dee	Chesterfield Ruby Elementary	268	909	
	Florence Williams Middle	641		
Lowcountry	Berkeley Hannah Middle	745	1,044	
	Orangeburg Dover Elementary	299		
Upstate	Anderson Nevitt Forest Elementary	405	405	
Midlands	Aiken Millbrook Elementary	633	8,537	
	Kershaw Jackson Elementary	485		
	Lexington	Batesburg-Leesville Elementary		464
		Gilbert High		941
		Springdale Elementary		572
	Newberry	Mid-Carolina High		721
		Mid-Carolina Middle		589
	Richland Summit Parkway Middle	1,127		
	York	Gold Hill Elementary		821
		Gold Hill Middle		783
India Hook Elementary		564		
Orchard Park Elementary		837		
Total of Students Impacted			10,895	

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Outcome #2: Behavior Change Observed:

During the 2012-2013 school calendar, 61 schools were enrolled into the Breathe Better program. However, only 39 schools successfully reported usable data and were considered active Breathe Better participants.

One of the major components of the program is the ability to measure a school's success. One way that we are able to demonstrate a school has satisfied this is through **usable data**. **Usable data** is the submission of at least two data points (**one baseline data set prior to posting signs and sharing information about the program and at least one additional data set before the end of the school year**).

At the beginning of the school year, approximately 24.1% of cars drivers and 27.2% of bus drivers were observed idling while waiting to pick up a student after school. By the end of school year just 19.5% of cars and 16.8% of buses were idling, **an idling reduction of 18.9% for cars and 38.1% for buses**.

Note: This data is self-reported and may contains some inconsistencies, some of which are related to the warm weather during the fall and spring data collections. Despite this factor, the overall trend has been towards positive behavioral change.

Outcome #3: Emissions Reductions Estimated

Emissions reductions are estimated for the following pollutants: carbon dioxide (CO₂), volatile organic compounds (VOCs), carbon monoxide (CO), oxides of nitrogen (NO_x) and particulate matter (PM). Proportionate quantities of priority and toxic chemicals are also reduced.

Due to the varying circumstances at these schools and several confounding factors (ex. effect of weather on drivers' behavior), the following assumptions are necessary to estimate quantitative emissions reductions:

- All participating drivers avoided idling on all 180 days of the 2012-2013 school year (participation started at different times of the year and may have varied at times). Each driver reduced daily idling time by 15 minutes on average (based on anecdotal observations from participating schools).
- Both school buses and personal vehicles consume fuel at 0.5 gallons/hour while idling.

Idle Reduction and Fuel Savings

Assuming that **124 vehicles** (101 personal vehicles and 23 school buses) reduced their daily idling time by 15 minutes/day for all 180 days of the 2012-2013 school year, each participating vehicle, on average, avoided 45 hours of idling. The school buses collectively reduced **1,035 hours of idling**, and the personal vehicles collectively reduced **4,545 hours of idling**. Each vehicle saved 22.5 gallons of fuel. Collectively, the school buses **saved 518 gallons of diesel**, and the personal vehicles **saved 2,273 gallons of gasoline**.

CO₂ Emission Reductions

Diesel fuel emits 22.2 pounds CO₂/gallon consumed, and gasoline emits **19.6 pounds CO₂/gallon** consumed (<http://www.eia.gov/tools/faqs/faq.cfm?id=307&t=11>). Therefore, the **school buses reduced 5.8 tons** of CO₂, and the **personal vehicles reduced 22.0 tons** of CO₂.

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Criteria Pollutant Emission Reductions

- 1 gram = 0.0022 pounds
- Idling **school buses** emit an estimated: 4.968 g/hr VOCs, 43.505 g/hr NO_x, 25.630 g/hr CO and 1.523 g/hr PM
 - 11.3 pounds VOCs reduced
 - 99.1 pounds NO_x reduced
 - 58.4 pounds CO reduced
 - 3.5 pounds PM reduced
- Idling **personal vehicles (cars and light trucks)** emit an estimated: 3.309g/hr VOCs, 3.768g/hr NO_x, and 71.915g/hr CO.
 - 33.1 pounds VOCs reduced
 - 37.7 pounds NO_x reduced
 - 719.1 pounds CO reduced

Emissions Reduction Totals

Collectively, all vehicles that actively participated in Breathe Better by reducing idling time during the 2012-2013 school year achieved the following estimated emissions reductions:

- 27.8 tons CO₂
- 44.4 pounds of VOCs*
- 136.7 pounds of NO_x*
- 777.4 pounds CO
- 3.5 pounds of PM**

* Ground-level ozone precursors

** Bus emissions only